

and abdominal segments of the germinal streak. The segment which bears the chelicerae is separated later than the remainder of the thoracic segments, at a period when from three to four abdominal segments have arisen from the caudal section;

11. The segmentation of the appendages appears at a somewhat early stage;

12. There are no embryonic envelopes;

13. A flexure of the embryo takes place, as in the *Ara-neina*;

14. The lateral organs, which were described by Croneberg*, are represented in younger stages by large elongate vesicular sacs, which are connected with the body above the first pair of legs by means of a thin stalk. In the young immediately after birth the lateral organs are considerably diminished in size and shrunken. In the adult animal, apparently, the linguiform triangular folds of skin which are found beneath the mandibles must be regarded as a remnant of the lateral organs.—*Biologisches Centralblatt*, xii. Bd., no. 22 (November 15, 1892), pp. 687-689.

On Two Species of Myzostoma parasitic upon Antedon phalangium,
Müller. By M. HENRI PROUHO.

Antedon phalangium is the host of two species of *Myzostoma* described by von Graff under the names *Myzostoma pulvinar* and *M. ulatum*, and which were both discovered in the Minch during the expedition of the 'Porcupine.' I have met with these two parasites on their usual host in the dredgings made in the course of last summer by the boat belonging to the Arago Laboratory; and this enables me to communicate forthwith certain interesting features in the history of these Myzostomidae, which are so little known. I pass over the anatomical and histological details, which will be dealt with elsewhere.

Myzostoma pulvinar.—Herr von Graff, whose description of this species was founded upon a unique specimen, has well characterized its external form; he has drawn attention to the dorsal position of the mouth and the cloacal orifice, but he must have been led astray by the bad state of preservation of the specimen which he studied, for he states that the organs which are known in the other species of *Myzostoma* under the name of *suckers* are absent in this form, though these structures are really present, although not so well developed as in the majority of the other species.

Contrary to the opinion of von Graff, *Myzostoma pulvinar* does not live upon the disk of *Antedon phalangium*; it inhabits the

* A. Croneberg, "Ueber ein Entwicklungsstadium von *Galeodes*," *Zool. Anz.*, 10 Jahrg., 1887.

alimentary canal of its host, in which it is sufficiently deeply ensconced to be invisible from the exterior. The *Myzostoma* occupies almost the whole of the first portion (œsophagus and stomachal sac) of the alimentary canal of the *Comatula*, and is situated in such a way that its anterior extremity is turned towards the aboral pole. It applies itself by its ventral face, which is very convex and bears the ten parapodia, to the digestive epithelium of the *Comatula*, while its concave dorsal surface, looking towards the buccal orifice of the latter, forms a channel which affords a passage to the food-currents, which nourish at once host and parasite. The gutter-like form of the dorsal surface of *Myzostoma pulvinar* explains how it is that the latter, in spite of its considerable dimensions, does not completely obstruct the alimentary canal of the *Comatula*.

Myzostoma pulvinar, which is the first endoparasitic form belonging to this genus with which we are acquainted, is a dioecious species with well accentuated sexual dimorphism. In this, as in other points of its organization, it approaches the cysticolous members of the genus.

In linear dimensions the female is four and a half times larger than the male; it measures 4.5 millim. in each direction. It presents no trace of testes either in the adult or young state. As in the hermaphrodite species, its uterus communicates with the exterior by three ducts—a median one, which is a direct prolongation of the uterus itself, and two lateral ones, which open into the anterior portion of the cloaca (rectum).

The male only measures 1 millim. in length by 0.8 millim. in breadth; it hooks itself on to the integument of the female, upon which it is able to move pretty rapidly. In shape it is flattened and elliptical, recalling by the form of its body the free species of *Myzostoma*. Its alimentary canal is not branched, but exhibits on each side indications of the three ramifications which are seen in all the other species of the genus; its mouth, which is situated quite close to the marginal border, is ventral in position. It possesses two testes, one on each side of the alimentary canal, and each provided with a vas deferens which opens on the ventral surface.

The two sexes must become associated at a very early period, for I have observed a young female measuring 1.7 millim. in length which bore upon its back a male of 0.7 millim. The female in this instance did not as yet present any trace of ovaries, but already had the characteristic form of the adult.

Myzostoma alatum.—This species lives as a parasite upon the disk of *Antedon phalangium*, and its relations to its host are the same as those of *Myzostoma glabrum* to *Antedon rosacea*: its anatomy does not essentially differ from that of *Myzostoma glabrum*. Like the latter it is hermaphrodite, and my object in drawing attention to this species is occasioned by the fact that the observations which I have been able to make with regard to it raise a serious doubt as to the existence of the so-called *complemental* males in the hermaphrodite species. It is true that there are very frequently found upon the

dorsal surface of *Myzostoma alatum* what are supposed to be complementary males to the number of one or two, which exactly recall those which were described by Beard in *Myzostoma glabrum*, and which von Graff had probably been right in considering as young ones. Now a series of observations has convinced me, without any possible doubt, that the individuals attached to the dorsum of the hermaphrodite *Myzostoma alatum* are young ones of the same species, which, while they are males in their youth, with well-developed spermatozoa and vasa deferentia equal to those of the adult, *increase in size and acquire during growth ovaries which are identical with those of the hermaphrodite form which bears them*, and this without abandoning the dorsal surface of the latter. These supposed complementary males moreover possess, even in their youth and at a time when they show no trace of ovaries, genital ducts corresponding to the female genital ducts of the hermaphrodites (a fact which has already been observed by Nansen in *Myzostoma giganteum* and *M. Carpenteri*).

The complementary male therefore has no existence, in the proper sense of the word, in the case of *Myzostoma alatum*. This species is a proterandrous hermaphrodite form, in which the two male and female genital glands coexist in the adult. That the young male at the outset of its existence plays the part of a complementary is possible, but it is not proved; and in all cases its male condition is only transitory, which indicates perhaps that hermaphroditism in *Myzostoma* is an acquired condition, and not a primitive one.

I do not as yet possess proof that the complementary males of *Myzostoma glabrum* also acquire ovaries; but the facts which I have observed in the case of *Myzostoma alatum* lead me to believe that they do.

In conclusion, I would remark that the four species of *Myzostoma* with which we are at present acquainted as existing in the Mediterranean present us with three, or perhaps even with four, types, which are of interest from the point of view of the sexual organization of the genus *Myzostoma*, viz. :—

Hermaphrodite type, *Myzostoma cirriferum*.

Proterandrous hermaphrodite type, *Myzostoma alatum*.

Hermaphrodite type with complementary male (?), *Myzostoma glabrum*.

Dioecious type with dwarf male, *Myzostoma pulvinar*.

—*Comptes Rendus*, t. cxv. no. 20 (November 14, 1892), pp. 846-849.